MEMORANDUM

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To: John Zahina, SFWMD project manager for Lake Istokpoga MFL

From: Thomas E. Lodge, Ph.D., CEP, Science Peer Review Chairperson

Date: July 18, 2005

Subject: Proposed Lake Istokpoga Minimum Flows and Levels (MFL), Final Science Peer Review Panel Report

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This report presents the science review panel's opinions resulting from document review, a field trip on Lake Istokpoga on June 27, and two public workshops held in Lorida, Florida on June 28, 2005. The purpose of these workshops was to evaluate the sufficiency of science used in the "First Draft Technical Documentation to Support Development of Minimum Levels for Lake Istokpoga" developed by the SFWMD Water Supply Department, dated May 2005. The science review panel consisted of Dr. Thomas E. Lodge (chairman), Dr. Joel C. Trexler of Florida International University Department of Biological Science, and Dr. D. Derek Aday of The Ohio State University Department of Evolution, Ecology and Organismal Biology (currently relocating to the North Carolina State University).

CONSENSUS

The science panel agreed on the following:

1. The Lake Istokpoga draft MFL document covers the areas of science needed to establish the MFL criteria. No evidence is presented nor known to the panel indicating that the selected criteria are incorrect, but some areas are weak in scientific credibility, and there is too much use of qualitative language in defending MFL criteria instead of quantitative documentation. With additional data, as defined below, the draft MFL criteria might be shown correct or should be or modified accordingly.

2. Of the criteria, the panel agreed that the level (36.5 ft. NGVD, set at the lower elevation of the emergent littoral zone) and its duration (20 weeks) appeared reasonably defensible. Only the return frequency of the low water level (once in

four years) is questionable and may be too often, but the panel understood that the MFL criteria are not to be confused with a drawdown schedule. The MFL criteria would only allow such a drawdown frequency without causing a violation. As such, the frequency was viewed as not encumbering a drawdown schedule if CERP or other lake improvement initiatives determine that a new fluctuation schedule with low excursions will be ecologically beneficial.

3. The lack of cypress recruitment among lake's larger, old cypress (seen by the panel on the field trip) clearly demonstrates that the lake has been harmed by the modern restricted fluctuation schedule. Thus, establishing the legal framework for a new schedule that allows for lower levels – part of the function of the MFL – serves to help alleviate significant harm that has already occurred.

4. The gamefish data from before and after the 2001, single-drawdown event are insufficient to demonstrate that recovery actually occurred. The limited time of evaluation after the 2001 drawdown may be too short for the conclusions reached. The heavy dependence on these limited angler data for this single event is the document's weakest aspect.

5. Regarding gamefish data, Table 10 (p. 54) needs to be modified with supporting information in order to provide a credible basis for its use in supporting the MFL criteria. Its weaknesses are:
   - No measure of repeatability
   - Uncertainty is not defined
   - Standard error is not included
   - More explanation is needed to interpret some parameters, e.g., equivalency of combined bluegill and redear sunfish angler success with their separate listings after 1997. If the split data can be totaled to be equivalent to the combined number, it should be so noted.

6. The document should draw upon more literature and data. For example, information, including references, was provided in a letter dated August 16, 2004 from Dr. Mike S. Allen, UF-IFAS, Dept. of Fisheries and Aquatic Sciences, to Beacham Furse, FFWCC for the Lake Istokpoga Ecologic/Hydrologic Performance Measures panel workshop on August 26, 2004). Other useful information would include:
   - larval fish data
   - electrofishing data
   - recruitment data
   - trap net data

   If these data cannot be obtained, it is recommended that a monitoring program be developed to improve data collection accordingly.

7. There is a need to state clearly why water quality is not related to water level considerations for the purpose of establishing the MFL criteria. The panel understood that external loading of phosphorus is Lake Istokpoga's principal water quality problem, coupled with internal nutrient releases from aquatic weed (*Hydrilla*) control. While the overall water-level regime of lakes does affect water quality, the MFL criteria cannot reasonably be used to affect water quality in Lake Istokpoga. The MFL criteria only provide a guideline to avoid significant harm due to low water levels and are not part of a regulation schedule that could be beneficial in improving water quality. However, setting of the MFL criteria should not constrain the reasonable development/implementation of regulation schedules for improving water quality, habitat, etc. It is the panel's opinion that the proposed criteria do not represent a constraint.

8. With reference to the above, the lack of a water quality relationship between the selection of MFL criteria and *Hydrilla* control should be stated. For example, poor water quality resulting from herbicidal control of *Hydrilla* is not related nor under the reasonable control of the MFL criteria.

9. The question of possible mercury contamination in the food chain from drawdown is not sufficiently documented.

DOCUMENT REFINEMENTS NEEDED

1. Incorporate a better context for the Lake Istokpoga 2001 drawdown:
   - Lake Istokpoga fisheries data from pre-and-post-drought/drawdown are currently inadequate to measure benefit/decline in fish populations
   - Expand data base used in the document, including experience on other, comparable lakes
   - There should be more discussion and documentation on benefits other than direct fishery benefits (which must be further evaluated for verification). The value of the 2001 drawdown included the ability of affected landowners and other navigational interests to clean out then-dry navigational channels and boat basins, the removal of accumulated muck sediments from the littoral zone, the removal of tussocks, and the whole-lake treatment of *Hydrilla*, made possible by the low water volume of the lake at that time.

2. Consider modification of the MFL only if additional fisheries data warrant a change in the level, duration, or return frequency demonstrate that significant harm may occur by implementation of the draft MFL criteria.

3. Provide a better explanation for Figure 9 (p. 20). The value of the map cannot be understood by a reader without additional information, and there is an assumption that it is poorly printed rather than a composite of incomplete historic map data.

4. The term "significantly altered" as used by SWFWMD needs to be defined, (or noted that no precise definition is available).

5. Develop a discussion with data on the lack of recruitment of cypress in the littoral zone where large, old trees occur without younger trees. Testimony at the hearing stated that recruitment began to occur as a result of the 2001 drawdown, only to have seedlings perish as water levels rose. This information is important for establishing that the modern regulation schedule has been damaging because of its insufficient low-water excursions.

6. Make the following edits to the report:
   - Page iii. Significant harm is referenced in Chapter 373 requirements to include flood control, water quality protection, water supply and storage, fish and wildlife protection, navigation and recreation. However, on page iv, it is stated that significant harm "…for Lake Istokpoga is based primarily on impacts to the lake's biological resources…." The basis of not including the broader suite of categories needs a clearer explanation.
   - Page 3, paragraph under "Legal and Policy…." heading: It should be clarified why "flow" is not an issue in Lake Istokpoga (and most lakes), so that water level is the focus.
   - Page 14, second paragraph. The "Paleogene Epoch" should be changed to the "Paleogene epochs" as it represents the combined time of the Paleocene, Eocene, and Oligocene epochs.
   - Pages 24 (bottom) and 25. The text data do not all agree with the Figure 14. For examples, at 35 ft. the lake volume on Figure 14 is 48,075 ac-ft., not 62,500 ac-ft.; and neither graph extends to 43 ft. as inferred in the text. Also, the "linear" description of the relationship of stage and area might better be "asymptotic." The text and/or figure should be corrected for agreement.
   - Page 25. Elevations are described here in terms of sea level rather than NGVD as used earlier. It is suggested that the document should be consistent and NGVD is recommended as the standard.
   - Page 39, Table 6. The eastern mosquitofish is *Gambusia holbrooki*; the tadpole "darter" should be the tadpole madtom; and both bullheads listed are now in the genus *Ameiurus*, not *Ictalurus*. Also, a table in a paper by Furse, Champeau, Ford and others dated August 26, 2004 (presented at the Lake Istokpoga performance measures science review panel workshop of that date) included the following additional species, several of which may be ecologically important: blue tilapia (*Oreochromis aurea*), bowfin (*Amia calva*), brown hoplo (*Hoplosternum littorale*), channel catfish (*Ictalurus punctatus*), sailfin molly (*Poecilia latipinna*), walking catfish (*Clarias batrachus*), and white catfish (*Ameiurus catus*). Finally, the grass carp (*Ctenopharyngodon idella*) is mentioned (p. 35) as having been used in aquatic plant control. Is it still present in the lake? A clarification should be

included as well as better documentation of fish surveys, especially those that relate to the lake fishery.

- Pages 40-41: Conclusions about recruitment and age classes, etc., cannot be inferred from figures 20 and 21. There is no evidence to support the statements and the figures are not useful. It is suggested that a graph be inserted showing length by age or otherwise indicate cohorts on the length-frequency histograms to make it useful.
- Page 42, Plants and Animals of Special Concern. There is no mention of the snail kite – it should be included.
- Page 52, first paragraph. No citations for the burhead sedge (*Osycaryum cubense*) could be found except as a synonym for the current name, Cuban bulrush (*Scirpus cubensis*). It is suggested the latter names be used or referenced as synonyms.
- Page 54, first paragraph last line. The proper name for the referenced aquifer is "Floridan" aquifer.
- Page 64, line 2, delete word, "a".
- Page 83, second paragraph. The panel disagrees that addressing environmental impacts from water level stabilization is beyond the project's scope. *Significant harm* of low water is relative to level fluctuations, and therefore tied to the history of fluctuation stabilization. Setting the level at the low elevation of the existing emergent littoral zone addresses the situation, so the document and selected MFL are still valid, but the wording should reflect that setting a low level is relative to fluctuations that are ongoing and have caused harm by being too restrictive – thus the importance of the MFL being set below the existing control schedule.
- Page 98, bottom paragraph. "…the annual average hydroperiod for lake wetlands may be reduced below the typical range for these community types." This statement is so vague and general that its value is limited. There is much more specific information available from other lake drawdowns that could be cited. It is suggested this statement be reworded to reflect fishery recovery time and perhaps excessive interference with navigation and recreation, unless specific deleterious effects on littoral zone communities can be documented/referenced.

PANEL'S RECOMMENDATIONS

1. All relevant data for Lake Istokpoga from the Florida Fish and Wildlife Conservation commission and other sources should be obtained and used in the document. It is emphasized that size-specific fish data should be included from relevant studies conducted through more time than the short, post-2001 drydown event for Lake Istokpoga. Dependence on angler surveys should be minimized if alternative sources are available. Useful data would typically come from:
   - Electrofishing for large fish
   - Trap nets for small fish

If fishery data from the sources recommended above are insufficient, institute a monitoring program to begin collecting this information (also see Item 6 under Consensus).

2. Improve the explanations in document for:
   - Why water quality is not related to setting the MFL minimum level criteria as explained under consensus, above.
   - The lack of cypress recruitment in the littoral zone occupied by the large, aesthetically notable cypress trees. The panel recognized that cypress recruitment is outside of the scope of establishing the MFL criteria – that it would logically be addressed in developing the revised regulation schedule under CERP or other projects. However, a statement should be included that acknowledges the problem and the lack of a relationship to setting the MFL criteria, comparable to clarifying the relationship of water quality to the MFL criteria.

3. Clarify that the timing of drawdowns is outside of this project scope but will be addressed by CERP and other projects.

4. Vegetation monitoring should be implemented (or reported if such data/studies are available). Such monitoring should be:
   - Done through the long term – to detect slow successional changes, for example
   - Appropriate type for use in MFL and CERP pre-project
   - Systematic
   - Stress cypress recruitment because of the high importance of the large cypress trees around the lake (e.g. for osprey nesting and other habitat benefits, aesthetics, etc.)

The panel will agree, if consensus/document refinements and panel recommendations are completed, that the MFL criteria are based upon best available science and are reasonable.